

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization  
International Bureau



(43) International Publication Date  
9 March 2006 (09.03.2006)

PCT

(10) International Publication Number  
**WO 2006/025869 A2**

(51) International Patent Classification:  
*C10M 123/02* (2006.01)

(21) International Application Number:  
PCT/US2005/010217

(22) International Filing Date: 25 March 2005 (25.03.2005)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:  
60/556,430 26 March 2004 (26.03.2004) US

(71) Applicant (for all designated States except US): LUNA  
INNOVATIONS INCORPORATED [US/US]; 2851  
Commerce Street, Blacksburg, Virginia 24060 (US).

(72) Inventor; and

(75) Inventor/Applicant (for US only): GAUSE, Charles, B.  
[US/US]; 228 Lakeside Lane, Providence, North Carolina  
27315 (US).

(74) Agents: DADIO, Susan, M. et al.; Burns, Doane,  
Swecker & Mathis, LLP, P. O. Box 1404, Alexandria,  
Virginia 22313-1404 (US).

(81) Designated States (unless otherwise indicated, for every  
kind of national protection available): AE, AG, AL, AM,  
AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN,  
CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI,  
GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE,  
KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD,  
MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG,  
PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SM, SY,  
TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU,  
ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every  
kind of regional protection available): ARIPO (BW, GH,  
GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM,  
ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),  
European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI,  
FR, GB, GR, HU, IE, IS, IT, LT, LU, MC, NL, PL, PT, RO,  
SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN,  
GQ, GW, ML, MR, NE, SN, TD, TG).

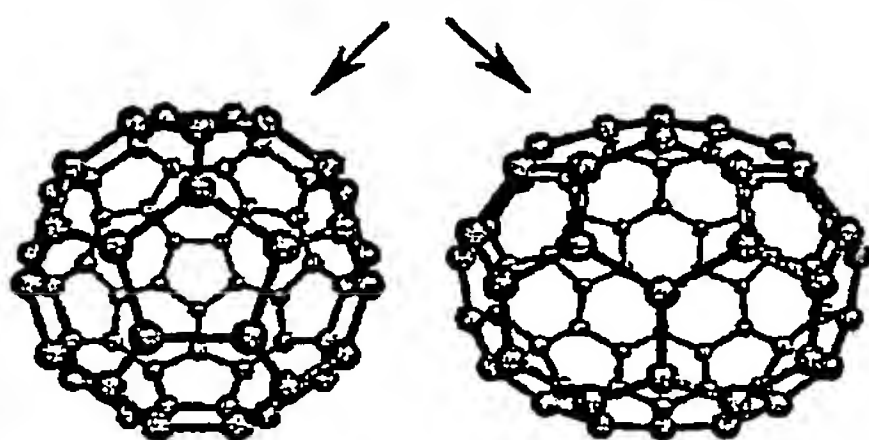
Published:

— without international search report and to be republished  
upon receipt of that report

For two-letter codes and other abbreviations, refer to the "Guid-  
ance Notes on Codes and Abbreviations" appearing at the begin-  
ning of each regular issue of the PCT Gazette.

(54) Title: TRIMETASPHERES AS DRY LUBRICANTS, WET LUBRICANTS, LUBRICANT ADDITIVES, LUBRICANT  
COATINGS, CORROSION-RESISTANT COATINGS AND THERMALLY-CONDUCTIVE MATERIALS

Empty Cage Fullerenes



$C_{60} (I_h)$

$C_{70} (D_{5h})$

(57) Abstract: Lubricants including at least one trimetasphere, lubricant  
additives including at least one trimetasphere, lubricant coatings including  
at least one trimetasphere, corrosion-resistant coatings including at least one  
trimetasphere and thermally-conductive materials comprising at least one  
trimetasphere are provided. Methods of making and using such lubricants,  
additives, coatings and materials are also provided.

WO 2006/025869 A2